

Amendments to the drawings:

The attached drawing sheets include changes to Figures 3 and 4A-D. The three replacement sheets replace the original sheets that included Figures 3 and 4A-D. Three annotated sheets showing drawing changes are also attached. In Figure 3 key symbols have been corrected as required by the Examiner to distinguish between devices, specifically to clarify the distinction between the symbols used for $\text{Ir}(\text{pq})_2(\text{acac})$ and $\text{Ir}(\text{Ph-ppy})_3$. In Figures 4A-D unnecessary text which is included in the brief description of the drawings has been removed so that all details of the drawings are reproducible in a printed patent as required by the Examiner.

REMARKS

Claims 1-44 were pending.

Claims 1-4, 12-14, 16, 29-38 and 40-43 are cancelled herein

Claims 5, 9, 11, 13 - 15, 17, 28, 39 and 44 are amended herein.

Applicants submit replacement sheets herewith for Figure 3 and Figures 4A-D in response to the objection to the drawings in the Office Action under reply. Figure 3 has been amended to clarify the distinction between the symbols used for $\text{Ir}(\text{pq})_2(\text{acac})$ and $\text{Ir}(\text{Ph-ppy})_3$ and to remove unnecessary text. Figures 4A-D have been corrected so that all details are reproducible in a printed patent.

In response to the objection to the specification directed to the CIE coordinates for Example 7 in Table 2 on page 45, paragraph [00121 (which includes Table 2) has been replaced. Applicants have amended the first CIE coordinate for Example 7 in Table 2 to insert the correct coordinate --0.31-- in place of the incorrect coordinate " 0.61" which appeared in Table 2 as the result of a typographical error.

With respect to the requirement for clarification/correction regarding how three sets of data points for $\text{Ir}(\text{ppy})_3$ in Figure 3 were obtained, Applicants respectfully direct the Examiner's attention to the specification at paragraphs [0012], [0052], [0054], and [00121] including Table 2. As set forth in the Brief Description of the Drawings, the data points in Figure 3 represent pixel shrinkage vs. time for various devices having a polyimide photo-resist grid used to define pixel dimensions of 0.01mm^2 to 5mm^2 under conditions of $10\text{mA}/\text{cm}^2$ dc current at room

temperature [0012]. The shrinkage may be defined as the width of the dim area which extends inward from the edge of the pixel, measured perpendicular from the pixel edge to the region of uniform brightness, and can be examined and measured using an optical microscope [para.0052]. Shrinkage rate, which is generally independent of pixel active area or shape, is typically dependent on current density and can also be temperature dependent [para. 0054].

In Figure 3, three sets of data points depict pixel shrinkages of 40 μm , 45 μm and 48 μm after 1000 hrs for Ir(ppy)₃ devices —●—, —◆—, and —*— respectively. The Ir(ppy)₃ device having the least amount of pixel shrinkage in terms of μm shrinkage observed over time at a constant temperature and current density (—●— having 40 μm shrinkage after 1000 hrs at a current density of 10mA/cm² dc current at room temperature) was selected as the closest prior art Ir(ppy)₃ device for comparison with the devices of the present invention (Comp. Example C shown in Table 2 on page 45).

Claims 1-5, 7-12, 15-21 and 28-44 are provisionally rejected under the judicially created doctrine of double patenting over claims 1-11, 14-20 and 25-41 in copending USSN 10/421,074. Applicants have also noted the Examiner's comments the regarding potential for a double patenting rejection of claims 13, 14 and 22-25 over claims 12 and 13 and 21-24 in copending USSN 10/021,474. Upon receipt of an indication of allowable subject matter, applicants will timely file a Terminal Disclaimer.

Claims 1-7, 9-22, 24, 26, 28-33 and 36 were rejected under 35 USC 112, first paragraph. Applicants respectfully submit that the cancellation of claims 1-4, 12, 16 and 29-33 and 36 obviates the rejection with respect to those claims. Amended Claim 5, which recites ML₃ organometallic complexes useful as emissive materials in the present invention, has been re-written in independent form and incorporates the grid limitations of original claims 13 & 14 and

the size limitations of original claim 16. Claims 6-7, 9-11, 13-15 and 17-28, as amended, all ultimately depend from amended claim 5. It is respectfully submitted that the application as filed enables one skilled in the art to make the invention commensurate in scope with the claims as amended herein. Applicants teach that the ML_3 class offers a significant advantage over the $ML_2(A^1-A^2)$ class as phosphorescent emissive materials in terms of a reduction in pixel shrinkage in the presence of a photoresist grid. In addition, Applicants teach that the substituents for the phenylpyridine ligands useful in the invention may be selected to increase the steric bulkiness and/or the molecular weight of the ligand so that the ligand is less labile, for example, in comparison to the unsubstituted phenylpyridine. Reconsideration and withdrawal of the rejection under 35 USC 112, first paragraph in light of the amended claims is respectfully requested.

Claims 1-33 and 35 were rejected under 35 USC 112, second paragraph. In response, applicants have amended the claims to more particularly point out and distinctly claim the present invention. The term "and" in the last line of claims 9 and 11 has been replaced by the term "or" to correct a typographical error. Independent claims 1 and 29 and dependant claim 36 have been cancelled. Claims 15 and 28 have been amended to more distinctly claim the invention and now depend from claim 5 which has no pixel shrinkage limitation and which has been amended to incorporate the size limitation of original claim 16, the grid limitation of original claim 12 and the photoresist limitations of original claims 13 and 14. Reconsideration and withdrawal of the rejection under 35 USC 112, second paragraph in light of the amended claims is respectfully requested.

Claims 1, 2, 7-16 and 29-33 were rejected over Kamatani '526, Tsuboyama '536 and/or Brown '743 as anticipated under 35 USC 102 (b) or (e) and claims 3, 4, 13, 14, 16, 32 and 33 were rejected as obvious under 35 USC 103 (a) over the same references. Claims 1-4, 12, 16 and 29-33 have been cancelled thereby obviating the rejections with respect to those claims. Applicants respectfully submit that the amended claims presented herein overcome the 35 USC 102 and 35 USC 103 rejections. Specifically, the photoresist grid limitation in combination with

size limitation incorporated into the amended device claims renders the amended claims novel and non-obvious over the prior art. As pointed out by the Examiner, the cited references do not specifically disclose a photoresist grid defining the pixels (as required by original claims 3, 4, 13, 14, 32 and 33) nor do they limit the pixel pitch (as required by original claim 16.) Moreover, none of the references, alone or in combination, teaches or suggests the use of a photoresist grid to define the pixels in a pixel array having a pixel pitch less than 500 μm as required by the present claims. One skilled in the art, aware that the presence of a photoresist grid significantly increases the rate of pixel shrinkage in an OLED (see Specification, para. [0054]), and taking into consideration that pixel shrinkage is much more significant for smaller size pixels in terms of the percentage of the pixel area affected, would not find it obvious in view of the prior art to use a photoresist grid to define the pixels when pixel pitch is less than 500 μm .

Claims 34, 35, 37, 38 and 40-43 were rejected under 35 USC 103 (a) as obvious over Grushin '638. This rejection is obviated by the cancellation of claims 34, 35, 37, 38 and 40-43 herein. Reconsideration and withdrawal is respectfully requested.

Claims 1-4 and 29-33 were rejected under the judicially created doctrine of double patenting and under 35 USC 103 (a) as obvious over Kwong '469 in view of Kwong's Compound 12 ($\text{Ir}_3\text{Mepq}_2(\text{acac})$). The cancellation of claims 1-4 and 29-33 obviates these rejections with respect to these claims. Withdrawal of the rejections in light of the amended claims is respectfully requested.

CONCLUSION

The present invention is particularly advantageous for high resolution devices requiring robust emissive materials that are resistant to pixel shrinkage even in the presence of a photoresist grid defining the pixels. As explained by applicants in their disclosure, pixel shrinkage is significant in devices having small pixel size in terms of the pixel area affected. Moreover, the presence of a photoresist grid is known to increase the rate of pixel shrinkage.

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Amdt. Dated June 10, 2005
Reply to Office Action of Feb. 10, 2005

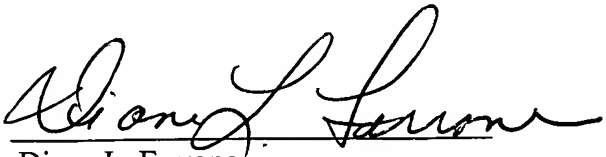
The cited references, whether taken alone or in combination, do not teach or suggest the advantages, in terms of reduced pixel shrinkage, of substituted bidentate ligands over unsubstituted bidentate in metal complexes useful as emissive materials. Nor does the prior art teach that, when emissive materials comprising substituted phenylpyridine ligands are incorporated into an organic light emitting device having a photoresist pixel grid, those materials having the form of ML_3 , are less sensitive to pixel shrinkage than their $ML_2(A^1-A^2)$ counterparts. Applicants arrived at the claimed invention as a whole through targeted research and development well beyond that which would be obvious to one of ordinary skill in view of the references cited.

Having fully addressed the Examiner's rejections and comments, it is respectfully submitted that this application is in condition for allowance. An early and favorable response is earnestly solicited. If a telephone interview would assist in advancing the prosecution of the subject application, the Examiner is invited to telephone applicant's undersigned attorney at the number provided.

The Commissioner is hereby authorized to charge any fees which may be due and owing with respect to this amendment to Deposit Account No. 502897.

Respectfully submitted,

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Attachment

Figure 3

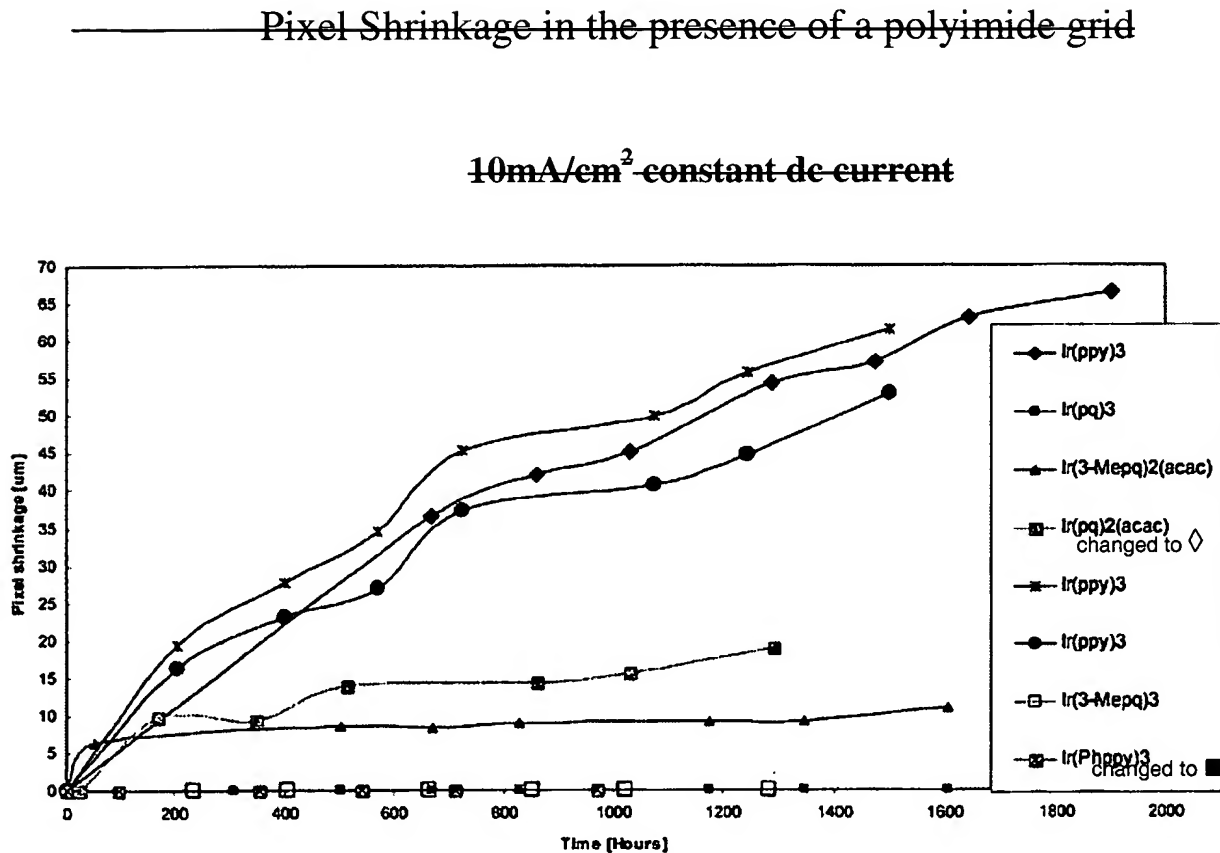


FIGURE 3

Appl. No. 10/421,074
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Annotated Sheet Showing Changes

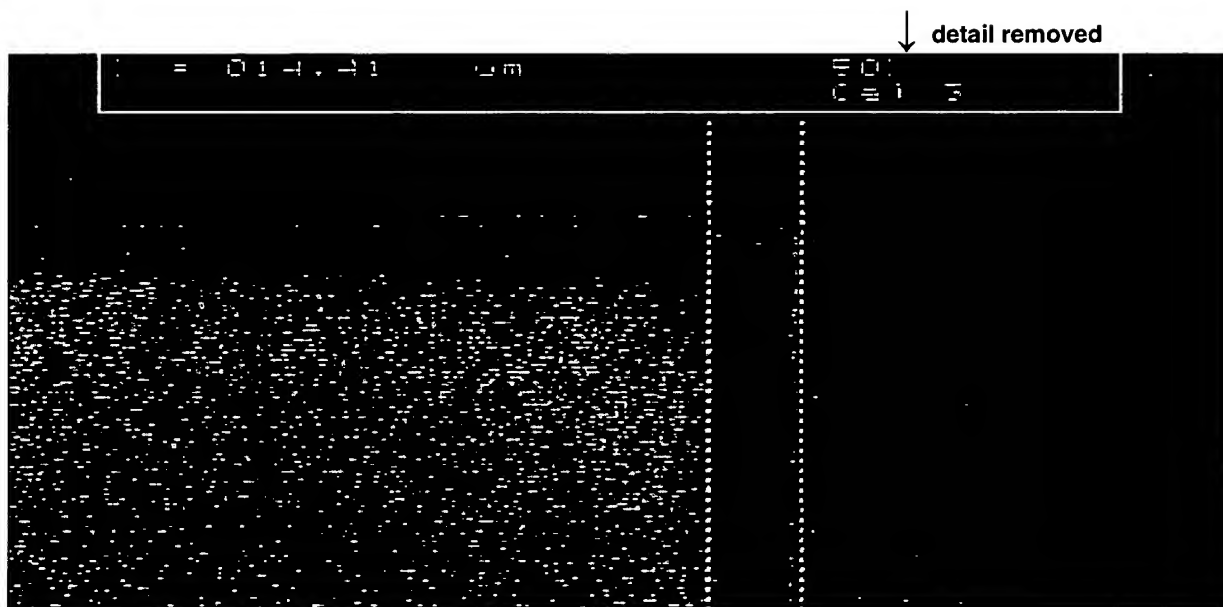


FIGURE 4A –PRIOR ART



FIGURE 4B

Appl. No. 10/421,074
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Annotated Sheet Showing Changes

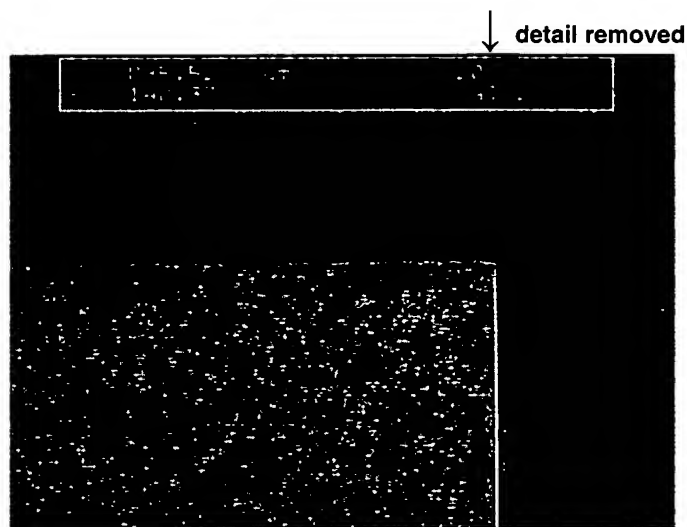


FIGURE 4C



FIGURE 4D